

STATUS OF THE CLAIMS

1-3. (Cancelled)

4. (Previously Presented) An auto-tensioner for engine accessories, comprising:

a cylinder having an open top end, and a closed bottom end;

a sleeve having a bottom and inserted in said cylinder such that a radially outer surface of said sleeve is in contact, over the entire axial length thereof, with a radially inner surface of said cylinder;

a seal member mounted to said cylinder at said open top end thereof to prevent leakage of hydraulic oil in said cylinder, said seal member having a rod-inserting hole therethrough so as to define an inner periphery of said seal member;

a rod slidably extending through said rod-inserting hole of said seal member such that said rod is always kept in contact with said inner periphery of said seal member regardless of an axial sliding position of said rod within said rod-inserting hole of said seal member;

a plunger connected to a bottom end of said rod so as to be slidable in said sleeve along an axial direction, said plunger defining a pressure chamber below said plunger in said sleeve, and said plunger defining a reservoir chamber above said plunger in said cylinder such that, with hydraulic oil present in said reservoir chamber, an air gap is present in said reservoir chamber between the hydraulic oil and said seal member, said plunger having a passage through which said pressure chamber communicates with said reservoir chamber;

a check valve provided at said passage to close said passage when a pressure in said pressure chamber exceeds a pressure in said reservoir chamber; and

a return spring mounted around said cylinder to bias said rod outwardly of said cylinder;

wherein a minute oil leak gap is formed between sliding surfaces of said sleeve and said plunger such that hydraulic oil can flow from said pressure chamber into said reservoir chamber via said minute oil leak gap, said minute oil leak gap having a cross-sectional area, in a cross section perpendicular to the axial direction, substantially smaller than a cross-sectional area, in a cross section perpendicular to the axial direction, of said passage;

wherein a return chamber is defined by said closed bottom of said cylinder and under said sleeve so as to communicate with said reservoir chamber, said bottom of said sleeve being formed with a valve hole through which said return chamber communicates with said pressure chamber; and

wherein a relief valve is provided at said valve hole to open said valve hole if the pressure in said pressure chamber exceeds a set pressure.

5. (Previously presented) An auto-tensioner according to claim 4, wherein said return chamber communicates with said reservoir chamber through at least one axial groove formed in a surface between said sleeve and said cylinder.

6. (Previously presented) An auto-tensioner according to claim 5, wherein the surface in which said at least one axial groove is formed is an outer peripheral surface of said sleeve.

7. (Previously presented) An auto-tensioner according to claim 4, wherein said seal member is interposed radially between said rod and said cylinder so as to seal a radial gap between said rod and said cylinder.

8. (Previously presented) An auto-tensioner according to claim 4, wherein said seal member and said sleeve are separate and distinct members.

9. (Previously presented) An auto-tensioner according to claim 8, wherein said seal member is interposed radially between said rod and said cylinder so as to seal a radial gap between said rod and said cylinder.

10. (Previously presented) An auto-tensioner according to claim 9, wherein said seal member is spaced apart from said sleeve and is disposed above a top end of said sleeve.

11. (Previously presented) An auto-tensioner according to claim 10, further comprising a wear ring mounted to said rod and disposed inside said cylinder, said wear ring being in sliding contact with an inner peripheral surface of said cylinder to support an intermediate portion of said rod.

12. (Previously presented) An auto-tensioner according to claim 11, wherein said wear ring is disposed axially between said seal member and said top end of said sleeve.

13. (Previously presented) An auto-tensioner according to claim 4, further comprising a wear ring mounted to said rod and disposed inside said cylinder, said wear ring being in sliding contact with an inner peripheral surface of said cylinder to support an intermediate portion of said rod.

14. (Previously presented) An auto-tensioner according to claim 13, wherein said wear ring is disposed axially between said seal member and a top end of said sleeve.

15. (Previously Presented) An auto-tensioner according to claim 4, wherein said pressure chamber is formed by said sleeve and said plunger, and said return chamber is formed by said closed bottom end of said cylinder and said sleeve.

16. (Previously Presented) An auto-tensioner according to claim 15, wherein a spring is disposed in said return chamber to close said relief valve when pressure in said pressure chamber does not exceed said set pressure.

17. (Previously Presented) An auto-tensioner according to claim 15, wherein the return chamber is in fluid communication with the reservoir chamber through a groove formed between the sleeve and the cylinder in a surface of one of the sleeve and the cylinder.

18. (Previously Presented) An auto-tensioner according to claim 15, wherein the return chamber is in fluid communication with the pressure chamber, and receives hydraulic oil from the pressure chamber when movement of the plunger compresses the pressure chamber to a pressure exceeding the set pressure.